



## Radio Monitoring Of The Magnetar XTE J1810-197 Over A Thousand Days

Yogesh Maan<sup>(1)</sup>

(1) National Centre for Radio Astrophysics (NCRA - TIFR), Pune - 411007, India, e-mail:  
ymaan@ncra.tifr.res.in

Magnetars were discovered via their high energy emission. These exotic objects often exhibit persistent but highly variable X-ray emission, and are characterized by high magnetic fields and young ages. A handful of the known magnetars also exhibit transient radio emission. The detection of radio emission firmly ruled out the alternative accretion based models of the magnetars' X-ray emission. Unlike the normal radio pulsars, the average emission profile and other radio properties of magnetars are highly variable. The radio emission itself typically follows an X-ray outburst, and disappears after some time. The physical processes that cause the onset of the radio emission, or its cessation afterwards, have remained unclear.

The first-ever magnetar which was found to emit radio emission is XTE J1810-197. In late 2018, this magnetar transitioned into its only second known radio outburst phase. Our radio monitoring observations of XTE J1810-197 in its recent active phase have uncovered several interesting properties. Particularly, monitoring over about 1000 days has uncovered a gradually evolving emission beam as well as the radio spectrum of the magnetar. Seen for the first time, such a systematic evolution has important implications for understanding the emission mechanism as well as for a potential presence of a wind nebula around the magnetar. Moreover, the magnetar also emits narrow spikes of radio emission with, likely intrinsic, radio frequency structures. These structures might indicate a phenomenological link of the magnetar radio emission with the giant pulse emission known in a few pulsars and possibly the repeating fast radio bursts (FRBs), which also show interesting but much more detailed spectral structures. These findings will be presented and discussed in the context of the radio emission components known from pulsars, FRBs and magnetars.